

FIG. 1

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LINKER #1 15bp | SV40 ORIGIN=332bp  
 GACGTCGCGG CCGCTCTAGG CCTCCAAAA AGCCTCTCA CTACTTCTGG AATAGCTCAG 60  
 AGGCCGAGGC GGCCTCGGCC TCTGCATAAA TAAAAAAAT TAGTCAGCCA TGCATGGGGC 120  
 GGAGAATGGG CGGAAGTGGG CGGAGTTAGG GCGGGGATGG GCGGAGTTAG GGGCGGGACT 180  
 ATGGTTGCTG ACTAATTGAG ATGCATGCTT TGCATACTTC TGCCTGCTGG GGAGCCTGGG 240  
 GACTTTCCAC ACCTGGTTGC TGAATAATTG AGATGCATGC TTTGCATACT TCTGCCTGCT 300  
 GGGGAGCCTG GGGACTTTCC ACACCCTAAC TGACACACAT TCCACAGAAT TAATTCCCCT 360  
 AGTTATTAAT AGTAATCAAT TACGGGGTCA TTAGTTCATA GCCCATATAT GGAGTTCCGC 420  
 GTTACATAAC TTACGGTAAA TGGCCCGCCT GGCTGACCGC CCAACGACCC CCGCCCATTTG 480  
 ACGTCAATAA TGACGTATGT TCCCATAGTA ACGCCAATAG GGACTTTCCA TTGACGTCAA 540  
 TGGGTGGACT ATTTACGGTA AACTGCCCCAC TTGGCAGTAC ATCAAGTGTA TCATATGCCA 600  
 AGTACGCCCC CTATTGACGT CAATGACGGT AAATGGCCCC CCTGGCATTG TGCCAGTAC 660  
 ATGACCTTAT GGGACTTTCC TACTTGGCAG TACATCTACG TATTAGTCAT CGCTATTACC 720  
 ATGGTGATGC GGTTTTGGCA GTACATCAAT GGGCGTGGAT AGCGGTTTGA CTCACGGGGA 780  
 TTTCCAAGTC TCCACCCCAT TGACGTCAAT GGGAGTTTGT TTTGGCACCA AAATCAACGG 840  
 GACTTTCCAA AATGTCGTAA CAACTCCGCC CCATTGACGC AAATGGGCGG TAGGCGTGTA 900  
 CGGTGGGAGG TCTATATAAG CAGAGCTGGG TACGTGAACC GTCAGATCGC CTGGAGACGC 960  
 CATCACAGAT CTCTCACCAT GAGGGTCCCC GCTCAGCTCC TGGGGCTCCT GCTGCTCTGG 1020  
 CTCCCAGGTG CACGATGTGA TGGTACCAAG GTGGAAATCA AACTGACGGT GGCTGCACCA 1080  
 TCTGTCTTCA TCTTCCCGCC ATCTGATGAG CAGTTGAAAT CTGGAAGTGC CTCTGTTGTG 1140  
 TGCTGCTGA ATAATTCTA TCCAGAGAG GCCAAAGTAC AGTGAAGGT GGATAACGCC 1200  
 HUMAN KAPPA CONSTANT 324bp 107 AMINO ACID & STOP CODON  
 CTCCAATCGG GTAACCTCCA GGAGAGTGTC ACAGAGCAGG ACAGCAAGGA CAGCACCTAC 1260  
 AGCCTCAGCA GCACCCTGAC GCTGAGCAAA GCAGACTACG AGAAACACAA AGTCTACGCC 1320  
 TGCGAAGTCA CCCATCAGGG CCTGAGCTCG CCCGTCACAA AGAGCTTCAA CAGGGGAGAG 1380  
 STOP  
 LIGHT  
 CHAIN | Eco RI LINKER #4=85bp  
 TGTGCAATTC AGATCCGTTA ACGGTTACCA ACTACCTAGA CTGGATTCGT GACAACATGC 1440  
 GGCCGTGATA TCTACGTATG ATCAGCCTCG ACTGTGCCTT CTAGTTGCCA GCCATCTGTT 1500

FIG. 2A

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GTTTGCCCCT CCCCCGTGCC TTCCTTGACC CTGGAAGGTG CCACTCCCAC TGTCTTTTCC 1560  
TAATAAAATG AGGAAATTGC **BGH poly A=231bp** ATCGCATTGT CTGAGTAGGT GTCATTCTAT TCTGGGGGGT 1620  
GGGGTGGGGC AGGACAGCAA GGGGGAGGAT TGGGAAGACA ATAGCAGGCA TGCTGGGGAT 1680  
GCGGTGGGCT CTATGGAACC **LINKER #5=15bp** AGCTGGGGCT CGACAGCTAT GCCAAGTACG CCCCTATTG 1740  
ACGTCAATGA CGGTAAATGG CCCGCTGGC ATTATGCCCA GTACATGACC TTATGGGACT 1800  
TTCCTACTTG GCAGTACATC TACGTATTAG TCATCGCTAT TACCATGGTG ATGCGGTTTT 1860  
GGCAGTACAT CAATGGGCGT **CMV PROMOTER-ENHANCER=334bp** GGATAGCGGT TTGACTCAGG GGGATTTCCA AGTCTCCACC 1920  
CCATTGACGT CAATGGGAGT TTGTTTTGGC ACCAAAATCA ACGGGACTTT CCAAAATGTC 1980  
GTAACAACCTC CGCCCCATTG ACGCAAATGG GCGGTAGGCG TGTACGGTGG GAGGTCTATA 2040  
TAAGCAGAGC **LINKER #6=7bp** TGGGTACGTC CTCACATTCA GTGATCAGCA CTGAACACAG **Sal I** ACCCGTCCGAC 2100  
2051 2 2058 9 **LEADER=51bp** **Mlu I 2151 2 Nhe I**  
ATGGGTTGGA GCCTCATCTT GCTCTTCCTT GTCGCTGTTG CTACGCGTGT CGCTAGCACC 2160  
START HEAVY CHAIN -5 -4 -3 114 115  
AAGGGCCCAT CGGTCTTCCC CCTGGCACCC TCCTCCAAGA GCACCTCTGG GGGCACAGCG 2220  
GCCCTGGGCT GCCTGGTCAA GGACTACTTC CCCGAACCGG TGACGGTGTC GTGGAACCTCA 2280  
GGCGCCCTGA CCAGCGGCGT GCACACCTTC CCGGCTGTCC TACAGTCCTC AGGACTCTAC 2340  
TCCCTCAGCA GCGTGGTGAC CGTGCCCTCC AGCAGCTTGG GCACCCAGAC CTACATCTGC 2400  
**993bp=330 AMINO ACID & STOP CODON**  
AACGTGAATC ACAAGCCAG CAACACCAAG GTGGACAAGA AAGCAGAGCC CAAATCTTGT 2460  
GACAAAACCTC ACACATGCCC ACCGTGCCCA GCACCTGAAC TCCTGGGGGG ACCGTCAGTC 2520  
TTCCTCTTCC CCCCAAAACC CAAGGACACC CTCATGATCT CCCGGACCCC TGAGGTCACA 2580  
TGCGTGGTGG TGGACGTGAG CCACGAAGAC CCTGAGGTCA AGTTCAACTG GTACGTGGAC 2640  
GGCGTGGAGG TGCATAATGC CAAGACAAAG CCGCGGGAGG AGCAGTACAA CAGCACGTAC 2700  
CGTGTGGTCA GCGTCCTCAC CGTCCTGCAC CAGGACTGGC TGAATGGCAA GGACTIONAAG 2760  
TGCAAGGTCT CCAACAAAGC CCTCCCAGCC CCCATCGAGA AAACCATCTC CAAAGCCAAA 2820  
GGGCAGCCCC GAGAACCACA GGTGTACACC CTGCCCCCAT CCCGGGATGA GCTGACCAGG 2880  
AACCAGGTCA GCCTGACCTG CCTGGTCAAA GGCTTCTATC CCAGCGACAT CGCCGTGGAG 2940  
TGGGAGAGCA ATGGGCAGCC GGAGAACAAC TACAAGACCA CGCCTCCCGT GCTGGACTCC 3000

FIG. 2B

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GACGGCTCCT TCTTCCTCTA CAGCAAGCTC ACCGTGGACA AGAGCAGGTG GCAGCAGGGG 3060  
AACGTCTTCT CATGCTCCGT GATGCATGAG GCTCTGCACA ACCACTACAC GCAGAAGAGC 3120  
**STOP HEAVY CHAIN** **Bam HI** **LINKER #7=81bp**  
CTCTCCCTGT CTCCGGGTAA ATGAGGATCC GTTAACGGTT ACCAACTACC TAGACTGGAT 3180  
3144 5  
TCGTGACAAC ATGCGGCCGT GATATCTACG TATGATCAGC CTCGACTGTG CTTTCTAGTT 3240  
3225 6  
GCCAGCCATC TGTTGTTTGC CCCTCCCCCG TGCCTTCCTT GACCCTGGAA GGTGCCACTC 3300  
**BOVINE GROWTH HORMONE POLYADENYLATION REGION=231bp**  
CCACTGTCTT TTCCTAATAA AATGAGGAAA TTGCATCGCA TTGTCTGAGT AGGTGTCATT 3360  
CTATTCTGGG GGGTGGGGTG GGGCAGGACA GCAAGGGGGA GGATTGGGAA GACAATAGCA 3420  
GGCATGCTGG GGATGCGGTG GGCTCTATGG AACCAGCTGG GGCTCGACAG CGCTGGATCT 3480  
3456 7  
CCCGATCCCC AGCTTTGCTT CTCAATTTCT TATTTGCATA ATGAGAAAAA AAGGAAAATT 3540  
3490 1  
AATTTTAACA CCAATTCAGT AGTTGATTGA GCAAATGCGT TGCCAAAAAG GATGCTTTAG 3600  
**MOUSE BETA GLOBIN MAJOR PROMOTER=366bp**  
AGACAGTGTT CTCTGCACAG ATAAGGACAA ACATTATTCA GAGGGAGTAC CCAGAGCTGA 3660  
GACTCCTAAG CCAGTGAGTG GCACAGCATT CTAGGGAGAA ATATGCTTGT CATCACCGAA 3720  
GCCTGATTCC GTAGAGCCAC ACCTTGGTAA GGGCCAATCT GCTCACACAG GATAGAGAGG 3780  
GCAGGAGCCA GGGCAGAGCA TATAAGGTGA GGTAGGATCA GTTGCTCCTC ACATTTGCTT 3840  
CTGACATAGT TGTGTTGGGA GCTTGGATAG CTTGGACAGC TCAGGGCTGC GATTTTCGCG 3900  
3856 7 3875 6  
**LINKER #9=19bp** **5' UNTRANSLATED DHFR=82bp**  
CAAACTTGAC GGCAATCCTA GCGTGAAGGC TGGTAGGATT TTATCCCCGC TGCCATCATC 3960  
3957 8  
**START DHFR**  
GTTTCGACCAT TGAAGTGCAT CGTCGCCGTG TCCCAAAATA TGGGGATTGG CAAGAACGGA 4020  
GACCTACCTT GGCTCCGCT CAGGAACGAG TTCAAGTACT TCCAAAGAAT GACCACAACC 4080  
TCTTCAGTGG AAGGTAAACA GAATCTGGTG ATTATGGGTA GGAAAACCTG GTTCTCCATT 4140  
**MOUSE DHFR=564bp=187 AMINO ACID & STOP CODON**  
CCTGAGAAGA ATCGACCTTT AAAGGACAGA ATTAATATAG TTCTCAGTAG AGAACTCAA 4200  
GAACCACCAC GAGGAGCTCA TTTTCTTGCC AAAAGTTTGG ATGATGCCTT AAGACTTATT 4260  
GAACAACCGG AATTGGCAAG TAAAGTAGAC ATGGTTTGGG TAGTCGGAGG CAGTTCTGTT 4320  
TACCAGGAAG CCATGAATCA ACCAGGCCAC CTTAGACTCT TTGTGACAAG GATCATGCAG 4380  
GAATTTGAAA GTGACACGTT TTTCCAGAA ATTGATTTGG GGAAATATAA ACTTCTCCCA 4440  
GAATACCCAG GCGTCCTCTC TGAGGTCCAG GAGGAAAAAG GCATCAAGTA TAAGTTTGAA 4500

FIG. 2C

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STOP DHFR  
 GTCTACGAGA AGAAAGAC TA ACAGGAAGAT GCTTTCAAGT TCTCTGCTCC CCTCCTAAAG 4560  
 4521 2  
 3' UNTRANSLATED DHFR=82bp LINKER #10=10bp  
 TCATGCATTT TTATAAGACC ATGGGACTTT TGCTGGCTTT AGATCAGCCT CGACTGTGCC 4620  
 4603 4 4613 4  
 TTCTAGTTGC CAGCCATCTG TTGTTTGGCC CTCCCCCGTG CCTTCCTTGA CCCTGGAAGG 4680  
 BOVINE GROWTH HORMONE POLYADENYLATION REGION=231bp  
 TGCCACTCCC ACTGTCCTTT CCTAATAAAA TGAGGAAATT GCATCGCATT GTCTGAGTAG 4740  
 GTGTCATTCT ATTCTGGGGG GTGGGGTGGG GCAGGACAGC AAGGGGGAGG ATTGGGAAGA 4800  
 CAATAGCAGG CATGCTGGGG ATGCGGTGGG CTCTATGGAA CCAGCTGGGG CTCGAGCTAC 4860  
 4844 5 LINKER #11=17bp  
 TAGCTTTGCT TCTCAATTC TTATTTGCAT AATGAGAAAA AAAGGAAAAT TAATTTTAAC 4920  
 ACCAATTCAG TAGTTGATTG AGCAAATGCG TTGCCAAAAA GGATGCTTTA GAGACAGTGT 4980  
 MOUSE BETA GLOBIN MAJOR PROMOTER=366bp  
 TCTCTGCACA GATAAGGACA AACATTATTC AGAGGGAGTA CCCAGAGCTG AGACTCCTAA 5040  
 GCCAGTGAGT GGCACAGCAT TCTAGGGAGA AATATGCTTG TCATCACCGA AGCCTGATTG 5100  
 CGTAGAGCCA CACCTTGGTA AGGGCCAATC TGCTCACACA GGATAGAGAG GGCAGGAGCC 5160  
 AGGGCAGAGC ATATAAGGTG AGGTAGGATC AGTTGCTCCT CACATTTGCT TCTGACATAG 5220  
 TTGTGTTGGG AGCTTGGATC GATCCTCTAT GTTGAACAA GATGGATTGC ACGCAGGTTC 5280  
 5227 8 5248 9 LINKER #12=21bp START NEO  
 TCCGGCCGCT TGGGTGGAGA GGCTATTCGG CTATGACTGG GCACAACAGA CAATCGGCTG 5340  
 CTCTGATGCC GCCGTGTTCC GGCTGTCAGC GCAGGGGCGC CCGGTTCTTT TTGTCAAGAC 5400  
 NEOMYCIN PHOSPHOTRANSFERASE  
 CGACCTGTCC GGTGCCCTGA ATGAAGTGA GGACGAGGCA GCGCGGCTAT CGTGGCTGGC 5460  
 795bp=264 AMINO ACIDS & STOP CODON  
 CACGACGGGC GTTCCTTGCG CAGCTGTGCT CGACGTTGTC ACTGAAGCGG GAAGGGACTG 5520  
 GCTGCTATTG GGCGAAGTGC CGGGGCAGGA TCTCCTGTCA TCTCACCTTG CTCCTGCCGA 5580  
 GAAAGTATCC ATCATGGCTG ATGCAATGCG GCGGCTGCAT ACGCTTGATC CGGCTACCTG 5640  
 CCCATTGAC CACCAAGCGA AACATCGCAT CGAGCGAGCA CGTACTCGGA TGAAGCCGG 5700  
 TCTTGTCGAT CAGGATGATC TGGACGAAGA GCATCAGGGG CTCGCGCCAG CCGAACTGTT 5760  
 CGCCAGGCTC AAGGCGCGCA TGCCCGACGG CGAGGATCTC GTCGTGACCC ATGGCGATGC 5820  
 CTGCTTGCCG AATATCATGG TGGAAAATGG CCGCTTTTCT GGATTCATCG ACTGTGGCCG 5880  
 GCTGGGTGTG GCGGACCGCT ATCAGGACAT AGCGTTGGCT ACCCGTGATA TTGCTGAAGA 5940  
 GCTTGCGGC GAATGGGCTG ACCGCTTCCT CGTGCTTTAC GGTATCGCCG CTTCCCGATTG 6000

FIG. 2D

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GCAGCGCATC GCCTTCTATC GCCTTCTTGA CGAGTTCTTC STOP NEO TGAGCGGGAC TCTGGGGTTC 6060  
6043 4  
GAAATGACCG ACCAAGCGAC GCCCAACCTG CCATCACGAG ATTTGATTC CACCGCCGCC 6120  
3' UNTRANSLATED NEO=173bp  
TTCTATGAAA GGTTGGGCTT CGGAATCGTT TTCCGGGACG CCGGCTGGAT GATCCTCCAG 6180  
CGCGGGGATC TCATGCTGGA GTTCTTCGCC CACCCCAACT TGTATTATGC AGCTTATAAT 6240  
6216 7  
GGTTACAAAT AAAGCAATAG CATCACAAAT TTCACAAATA AAGCATTTTT TCACTGCAT 6300  
SV40 POLY A EARLY=133bp LINKER #13=19bp  
TCTAGTTGTG GTTTGTCCAA ACTCATCAAT CTATCTTATC ATGTCTGGAT CGCGGCCGCG 6360  
6349 50  
ATCCCGTGA GAGCTTGGCG TAATCATGGT CATAGCTGTT TCCTGTGTGA AATTGTTATC 6420  
6368 9  
CGCTCACAAT TCCACACAAC ATACGAGCCG GAAGCATAAA GTGTAAAGCC TGGGGTGCCT 6480  
AATGAGTGAG CTAATCACA TTAATTGCGT TCGCTCACT GCCCGCTTTC CAGTCGGGAA 6540  
ACCTGTCGTG CCAGCTGCAT TAATGAATCG GCCAACGCGC GGGGAGAGGC GGTTTGCGTA 6600  
PVC 19  
TTGGGCGCTC TTCCGCTTCC TCGCTCACTG ACTCGCTGCG CTCGGTCGTT CGGCTGCGGC 6660  
GAGCGGTATC AGCTCACTCA AAGGCGGTAA TACGGTTATC CACAGAATCA GGGGATAACG 6720  
CAGGAAAGAA CATGTGAGCA AAAGGCCAGC AAAAGGCCAG GAACCGTAA AAGGCCGCGT 6780  
6792=BACTERIAL ORIGIN OF REPLICATION  
TGCTGGCGTT TTTCCATAGG CTCCGCCCCC CTGACGAGCA TCACAAAAT CGACGCTCAA 6840  
GTCAGAGGTG GCGAAACCCG ACAGGACTAT AAAGATACCA GGCCTTTCCC CCTGGAAGCT 6900  
CCCTCGTGCG CTCTCCTGTT CCGACCCTGC CGCTTACCGG ATACCTGTCC GCCTTTCTCC 6960  
CTTCGGGAAG CGTGGCGCTT TCTCAATGCT CACGCTGTAG GTATCTCAGT TCGGTGTAGG 7020  
TCGTTGCTC CAAGCTGGGC TGTGTGCACG AACCCCCCGT TCAGCCCGAC CGCTGCGCCT 7080  
TATCCGGTAA CTATCGTCTT GAGTCCAACC CGGTAAGACA CGACTTATCG CCACTGGCAG 7140  
CAGCCACTGG TAACAGGATT AGCAGAGCGA GGTATGTAGG CGGTGCTACA GAGTTCTTGA 7200  
AGTGGTGGCC TAACTACGGC TACACTAGAA GGACAGTATT TGGTATCTGC GCTCTGCTGA 7260  
AGCCAGTTAC CTTGGAAGAA AGAGTTGGTA GCTCTTGATC CGGCAACAA ACCACCGCTG 7320  
GTAGCGGTGG TTTTTTTGTT TGCAAGCAGC AGATTACCGC CAGAAAAAA GGATCTCAAG 7380  
AAGATCCTTT GATCTTTTCT ACGGGGTCTG ACGCTCAGTG GAACGAAAAC TCACGTAAAG 7440  
GGATTTTGGT CATGAGATTA TCAAAAAGGA TCTTACCTA GATCCTTTTA AATTAAAAAT 7500

FIG. 2E

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GAAGTTTTAA ATCAATCTAA AGTATATATG AGTAAACTTG GTCTGACAGT TACCAATGCT 7560  
7550  
TAATCAGTGA GGCACCTATC TCAGCGATCT GTCTATTTTCG TTCATCCATA GTTGCCTGAC 7620  
TCCCCGTCGT GTAGATAACT ACGATACGGG AGGGCTTACC ATCTGGCCCC AGTGCTGCAA 7680  
TGATACCGCG AGACCCACGC TCACCGGCTC CAGATTTATC AGCAATAAAC CAGCCAGCCG 7740  
BETA LACTAMASE=861bp  
GAAGGGCCGA GCGCAGAAGT GGTCTTGCAA CTTTATCCGC CTCCATCCAG TCTATTAATT 7800  
286 AMINO ACID & STOP CODON  
GTTGCCGGGA AGCTAGAGTA AGTAGTTCGC CAGTTAATAG TTTGCGCAAC GTTGTTGCCA 7860  
TTGCTACAGG CATCGTGGTG TCACGCTCGT CGTTTGGTAT GGCTTCATTC AGCTCCGGTT 7920  
CCCAACGATC AAGGCGAGTT ACATGATCCC CCATGTTGTG CAAAAAGCG GTTAGCTCCT 7980  
TCGGTCCTCC GATCGTTGTC AGAAGTAAGT TGGCCGCAGT GTTATCACTC ATGGTTATGG 8040  
CAGCACTGCA TAATTCTCTT ACTGTCATGC CATCCGTAAG ATGCTTTTCT GTGACTGGTG 8100  
AGTACTCAAC CAAGTCATTC TGAGAATAGT GTATGCGGCG ACCGAGTTGC TCTTGCCCGG 8160  
CGTCAATACG GGATAATACC GCGCCACATA GCAGAACTTT AAAAGTGCTC ATCATTGGAA 8220  
AACGTTCTTC GGGGCGAAAA CTCTCAAGGA TCTTACCGCT GTTGAGATCC AGTTGATGT 8280  
AACCCACTCG TGCACCCAAC TGATCTTCAG CATCTTTTAC TTTACCAGC GTTTCTGGGT 8340  
GAGCAAAAAC AGGAAGGCAA AATGCCGCAA AAAAGGGAAT AAGGGCGACA CGGAAATGTT 8400  
START BETA LACTAMASE  
GAATACTCAT ACTCTTCCTT TTTCAATATT ATTGAAGCAT TTATCAGGGT TATTGTCTCA 8460  
8410  
TGAGCGGATA CATATTTGAA TGTATTTAGA AAAATAAACA AATAGGGGTT CCGCGCACAT 8520  
TTCCCCGAAA AGTGCCACCT

FIG. 2F

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LINKER #1=15bp  
GACGTCGCGG CCGCTCTAGG CCTCCAAAAA AGCCTCCTCA CTACTTCTGG AATAGCTCAG 60  
15 6

AGGCCGAGGC GGCCTCGGCC TCTGCATAAA TAAAAAAAT TAGTCAGCCA TGCATGGGGC 120

SV40 ORIGIN=332bp  
GGAGAATGGG CGGAAGTGGG CGGAGTTAGG GGCAGGATGG GCGGAGTTAG GGGCGGGACT 180  
ATGGTTGCTG ACTAATTGAG ATGCATGCTT TGCATACTTC TGCCTGCTGG GGAGCCTGGG 240  
GACTTTCCAC ACCTGGTTGC TGAATAATTG AGATGCATGC TTTGCATACT TCTGCCTGCT 300

LINKER #2=13bp  
GGGGAGCCTG GGGACTTTCC ACACCTAAC TGACACACAT TCCACAGAAAT TAATTCCCCT 360  
347 8

AGTTATTAAT AGTAATCAAT TACGGGGTCA TTAGTTCATA GCCCATATAT GGAGTTCCGC 420  
GTTACATAAC TTACGGTAAA TGGCCCGCCT GGCTGACCGC CCAACGACCC CCGCCCATTTG 480  
ACGTCAATAA TGACGTATGT TCCCATAGTA ACGCCAATAG GGACTTTCCA TTGACGTCAA 540

CVM PROMOTER-ENHANCER=567bp  
TGGGTGGACT ATTTACGGTA AACTGCCCCAC TTGGCAGTAC ATCAAGTGTA TCATATGCCA 600  
AGTACGCCCC CTATTGACGT CAATGACGGT AAATGGCCCG CCTGGCATTG TGCCAGTAC 660  
ATGACCTTAT GGGACTTTCC TACTTGGCAG TACATCTACG TATTAGTCAT CGCTATTACC 720  
ATGGTGATGC GGTTTTGGCA GTACATCAAT GGGCGTGGAT AGCGGTTTGA CTCACGGGGA 780  
TTTCCAAGTC TCCACCCCAT TGACGTCAAT GGGAGTTTGT TTTGGCACCA AAATCAACGG 840  
GACTTTCCAA AATGTCGTAA CAACTCCGCC CCATTGACGC AAATGGGCGG TAGGCGTGTA 900

LINKER #3=7bp  
CGGTGGGAGG TCTATATAAG CAGAGCTGGG TACGTGAACC GTCAGATCGC CTGGAGACGC 960  
927 8 934 5

Bgl 2 START LIGHT CHAIN NATURAL LEADER=66bp  
CATCACAGAT CTCTCACTAT GGATTTTCAG GTGCAGATTA TCAGCTTCCT GCTAATCAGT 1020  
978 9

GCTTCAGTCA TAATGTCCAG AGGACAAATT GTTCTCTCCC AGTCTCCAGC AATCCTGTCT 1080  
1044 5+1

GCATCTCCAG GGGAGAAGGT CACAATGACT TGCAGGGCCA GCTGAAGTGT AAGTTACATC 1140  
CACTGGTTCC AGCAGAAGCC AGGATCCTCC CCCAAACCCT GGATTTATGC CACATCCAAC 1200

LIGHT CHAIN VARIABLE REGION 318bp 106 AMINO ACID  
CTGGCTTCTG GAGTCCCTGT TCGCTTCAGT GGCAGTGGGT CTGGGACTTC TTACTCTCTC 1260  
ACCATCAGCA GAGTGGAGGC TGAAGATGCT GCCACTTATT ACTGCCAGCA GTGGACTAGT 1320

BsiWI  
AACCACCCA CGTTCGGAGG GGGGACCAAG CTGGAAATCA AACGTACGGT GGCTGCACCA 1380  
1362 3

TCTGTCTTCA TCTTCCCGCC ATCTGATGAG CAGTTGAAAT CTGGAACTGC CTCTGTTGTG 1440  
TGCTGCTGA ATAATTCTA TCCAGAGAG GCCAAAGTAC AGTGGAAGGT GGATAACGCC 1500

FIG. 3A



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HUMAN KAPPA CONSTANT=324bp=107 AMINO ACID & STOP CODON  
 CTCCAATCGG GTAACCTCCA GGAGAGTGTC ACAGAGCAGG ACAGCAAGGA CAGCACCTAC 1560  
 AGCCTCAGCA GCACCCTGAC GCTGAGCAAA GCAGACTACG AGAAACACAA AGTCTACGCC 1620  
 TCGGAAGTCA CCCATCAGGG CCTGAGCTCG CCCGTCACAA AGAGCTTCAA CAGGGGAGAG 1680  
 STOP  
 LIGHT CHAIN Eco RI LINKER #4=81bp  
 TGTGAATTC AGATCCGTTA ACGGTTACCA ACTACCTAGA CTGGATTCTG GACAACATGC 1740  
 1646 7 1771 2  
 GGCCGTGATA TCTACGTATG ATCAGCCTCG ACTGTGCCTT CTAGTTGCCA GCCATCTGTT 1800  
 GTTTGCCCT CCCCCGTGCC TTCCTTGACC CTGGAAGGTG CCACTCCAC TGTCTTTCC 1860  
 TAATAAATG AGGAAATTGC ATCGCATTGT CTGAGTAGGT GTCATTCTAT TCTGGGGGGT 1920  
 BOVINE GROWTH HORMONE POLYADENYLATION REGION=231bp  
 GGGGTGGGGC AGGACAGCAA GGGGAGGAT TGGGAAGACA ATAGCAGGCA TGCTGGGGAT 1980  
 GCGGTGGGCT CTATGGAACC AGCTGGGGCT CGACAGCTAT GCCAAGTACG CCCCCTATTG 2040  
 2002 3 2017 8  
 ACGTCAATGA CGGTAAATGG CCCGCCTGGC ATTATGCCCA GTACATGACC TTATGGGACT 2100  
 TTCCTACTTG GCAGTACATC TACGTATTAG TCATCGCTAT TACCATGGTG ATGCGGTTTT 2160  
 CMV PROMOTER-ENHANCER=334bp  
 GGCAGTACAT CAATGGGCGT GGATAGCGGT TTGACTCACG GGGATTTCAC AGTCTCCACC 2220  
 CCATTGACGT CAATGGGAGT TTGTTTTGGC ACCAAAATCA ACGGGACTTT CAAAATGTC 2280  
 GTAACAATC CGCCCCATTG ACGCAAATGG GCGGTAGGCG TGTACGGTGG GAGGTCTATA 2340  
 TAAGCAGAGC TGGGTACGTC CTCACATTCA GTGATCAGCA CTGAACACAG ACCCGTCCGAC 2400  
 2351 2 2358 9  
 START HEAVY CHAIN SYNTHETIC & NATURAL LEADER Mlu I 2457 8  
 ATGGGTTGGA GCCTCATCTT GCTCTTCCTT GTCGCTGTTG CTACCGGTGT CCTGTCCAG 2460  
 2401 -5 -4 -3 -2 -1 +1  
 GTACAATGC AGCAGCCTGG GGCTGAGCTG GTGAAGCCTG GGGCCTCAGT GAAGATGTCC 2520  
 TGCAAGGCTT CTGGCTACAC ATTTACCACT TACAATATGC ACTGGGTAAA ACAGACACCT 2580  
 HEAVY CHAIN VARIABLE=363bp=121 AMINO ACID  
 GGTCGGGGCC TGGAAATGGAT TGGAGCTATT TATCCCGGAA ATGGTGATAC TTCCTACAAT 2640  
 CAGAAGTTCA AAGGCAAGGC CACATTGACT GCAGACAAAT CCTCCAGCAC AGCCTACATG 2700  
 CAGCTCAGCA GCCTGACATC TGAGGACTCT GCGGTCTATT ACTGTGCAAG ATCGACTTAC 2760  
 TACGGCGGTG ACTGGTACTT CAATGTCTGG GCGGCAGGGA CCACGGTCAC CGTCTCTGCA 2820  
 Nhe I  
 GCTAGCACCA AGGGCCCATC GGTCTTCCCC CTGGCACCTT CCTCCAAGAG CACCTCTGGG 2880  
 GGCACAGCGG CCCTGGGCTG CCTGGTCAAG GACTACTTCC CCGAACCGGT GACGGTGTCTG 2940  
 HUMAN GAMMA 1 CONSTANT=993bp  
 TGGAATCAG GCGCCCTGAC CAGCGGCGTG CACACCTTCC CGGCTGTCTT ACAGTCCTCA 3000

FIG. 3B

00021060-002997

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330 AMINO ACID & STOP CODON  
GGACTCTACT CCCTCAGCAG CGTGGTGACC GTGCCCTCCA GCAGCTTGGG CACCCAGACC 3060  
TACATCTGCA ACGTGAATCA CAAGCCCAGC AACACCAAGG TGGACAAGAA AGCAGAGCCC 3120  
AAATCTTGTG ACAAACCTCA CACATGCCCA CCGTGCCCAG CACCTGAACT CCTGGGGGGA 3180  
CCGTCAGTCT TCCTCTTCCC CCCAAAACCC AAGGACACCC TCATGATCTC CCGGACCCCT 3240  
GAGGTCACAT GCGTGGTGGT GGACGTGAGC CACGAAGACC CTGAGGTCAA GTTCAACTGG 3300  
TACGTGGACG GCGTGGAGGT GCATAATGCC AAGACAAAGC CGCGGGAGGA GCAGTACAAC 3360  
AGCACGTACC GTGTGGTCAG CGTCCTCACC GTCCTGCACC AGGACTGGCT GAATGGCAAG 3420  
GAGTACAAGT GCAAGGTCTC CAACAAAGCC CTCCCAGCCC CCATCGAGAA AACCATCTCC 3480  
AAAGCCAAAG GGCAGCCCCG AGAACCACAG GTGTACACCC TGCCCCCATC CCGGGATGAG 3540  
CTGACCAAGA ACCAGGTCAG CCTGACCTGC CTGGTCAAAG GCTTCTATCC CAGCGACATC 3600  
GCCGTGGAGT GGGAGAGCAA TGGGCAGCCG GAGAACAAC ACAAGACCAC GCCTCCCGTG 3660  
CTGGACTCCG ACGGCTCCTT CTTCTCTAC AGCAAGCTCA CCGTGGACAA GAGCAGGTGG 3720  
CAGCAGGGGA ACGTCTTCTC ATGCTCCGTG ATGCATGAGG CTCTGCACAA CCACTACACG 3780  
CAGAAGAGCC TCTCCCTGTC TCCGGGTAAA TGAGGATCCG TTAACGGTTA CCAACTACCT 3840  
AGACTGGATT CGTGACAACA TGCGGCCGTG ATATCTACGT ATGATCAGCC TCGACTGTGC 3900  
CTTCTAGTTG CCAGCCATCT GTTGTITGCC CCTCCCCCGT GCCTTCCTTG ACCCTGGAAE 3960  
GTGCCACTCC CACTGTCCTT TCCTAATAAA ATGAGGAAAT TGCATCGCAT TGTCTGAGTA 4020  
GGTGTCAATC TATTCTGGGG GGTGGGGTGG GGCAGGACAG CAAGGGGGAG GATTGGGAAG 4080  
ACAATAGCAG GCATGCTGGG GATGCGGTGG GCTCTATGGA ACCAGCTGGG GCTCGACAGC 4140  
GCTGGATCTC CCGATCCCCA GCTTTGCTTC TCAATTTCTT ATTTGCATAA TGAGAAAAAA 4200  
AGGAAAATTA ATTTAACAC CAATTCAGTA GTTGATTGAG CAAATGCGTT GCCAAAAAGG 4260  
MOUSE BETA GLOBIN MAJOR PROMOTER=366bp  
ATGCTTTAGA GACAGTGGTC TCTGCACAGA TAAGGACAAA CATTATTGAG AGGGAGTACC 4320  
CAGAGCTGAG ACTCCTAAGC CAGTGAGTGG CACAGCATTG TAGGGAGAAA TATGCTTGTC 4380  
ATCACCGAAG CCTGATTCCG TAGAGCCACA CCTTGGTAAG GGCCAATCTG CTCACACAGG 4440  
ATAGAGAGGG CAGGAGCCAG GGCAGAGCAT ATAAGGTGAG GTAGGATCAG TTGCTCCTCA 4500

FIG. 3C

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CATTGCTTC TGACATAGTT LINKER #9=19bp 5' UNTRANSLATED DHFR=82bp 4560  
 GTGTTGGGAG CTGGGATAGC TTGGACAGCT CAGGGCTGCG 4544 5  
 4525 6  
 ATTCGCGCC AAACCTGACG GCAATCCTAG CGTGAAGGCT GGTAGGATTT TATCCCCGCT 4620  
START DHFR  
 GCCATC ATG TTCGACCATT GAACTGCATC GTCGCCGTGT CCCAAATAT GGGGATTGGC 4680  
 4626 7  
 AAGAACGGAG ACCTACCCTG GCCTCCGCTC AGGAACGAGT TCAAGTACTT CCAAAGAATG 4740  
 ACCACAACCT CTTCACTGGA AGGTAAACAG AATCTGGTGA TTATGGGTAG GAAAACCTGG 4800  
DHFR=564bp=187 AMINO ACID & STOP CODON  
 TTCTCCATTC CTGAGAAGAA TCGACCTTTA AAGGACAGAA TTAATATAGT TCTCAGTAGA 4860  
 GAACTCAAAG AACCACCACG AGGAGCTCAT TTTCTTGCCA AAAGTTTGGG TGATGCCTTA 4920  
 AGACTTATTG AACAACCGGA ATTGGCAAGT AAAGTAGACA TGGTTTGGAT AGTCGGAGGC 4980  
 AGTTCTGTTT ACCAGGAAGC CATGAATCAA CCAGGCCACC TTAGACTCTT TGTGACAAGG 5040  
 ATCATGCAGG AATTTGAAAG TGACACGTTT TTCCAGAAA TTGATTTGGG GAAATATAAA 5100  
 CTTCTCCCAG AATACCCAGG CGTCTCTCT GAGGTCCAGG AGGAAAAAGG CATCAAGTAT 5160  
STOP DHFR 3' UNTRANSLATED DHFR=82bp  
 AAGTTTGAAG TCTACGAGAA GAAAGACTAA CAGGAAGATG CTTTCAAGTT CTCTGCTCCC 5220  
 5140 1  
 CTCCTAAAGC TATGCATTTT TATAAGACCA TGGGACTTTT GCTGGCTTTA LINKER #10 5280  
 5272 3  
=10bp  
 GACTGTGCCT TCTAGTTGCC AGCCATCTGT TGTTTGCCCC TCCCCCGTGC CTTCTTGAC 5340  
BOVINE GROWTH HORMONE POLYADENYLATION=231bp  
 CCTGGAAGGT GCCACTCCA CTGTCTTTC CTAATAAAAT GAGGAAATTG CATCGCATTG 5400  
 TCTGAGTAGG TGTCATTCTA TTCTGGGGGG TGGGGTGGGG CAGGACAGCA AGGGGGAGGA 5460  
LINKER #11  
 TTGGGAAGAC AATAGCAGGC ATGCTGGGGA TCGGGTGGGC TCTATGGAAC CAGCTGGGGC 5520  
 5513 4  
=17bp  
 TCGAGCTACT AGCTTTGCTT CTCAATTCT TATTTGCATA ATGAGAAAAA AAGGAAAATT 5580  
 5530 1  
 AATTTTACA CCAATTCAGT AGTTGATTGA GCAAATGCGT TGCCAAAAAG GATGCTTTAG 5640  
MOUSE BETA GLOBIN MAJOR PROMOTER=366bp  
 AGACAGTGTT CTCTGCACAG ATAAGGACAA CTAGGGAGAA ATATGCTTGT CATCACCAGG 5700  
 GACTCCTAAG CCAGTGAGTG GCACAGCATT CTAGGGAGAA ATATGCTTGT CATCACCAGG 5760  
 GCCTGATTCC GTAGAGCCAC ACCTTGGTAA GGGCCAATCT GCTCACACAG GATAGAGAGG 5820  
 GCAGGAGCCA GGGCAGAGCA TATAAGGTGA GGTAGGATCA GTTGCTCCTC ACATTTGCTT 5880  
LINKER #12=21bp START NEO  
 CTGACATAGT TGTGTTGGGA GCTTGGATCG ATCTCTATG GTTGAACAAG ATGGATTGCA 5940  
 5896 7 5917 8  
 CGCAGGTTCT CCGGCCGCTT GGGTGGAGAG GCTATTCGGC TATGACTGGG CACAACAGAC 6000

FIG. 3D



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GACGCTCAAG TCAGAGGTGG CGAAACCCGA CAGGACTATA AAGATACCAG GCGTTTCCCC 7560  
 CTGGAAGCTC CCTCGTGCGC TCTCCTGTTT CGACCCTGCC GCTTACCGGA TACCTGTCCG 7620  
 CCTTTCTCCC TTCGGGAAGC GTGGCGCTTT CTCAATGCTC ACGCTGTAGG TATCTCAGTT 7680  
 CGGTGTAGGT CGTTCGCTCC AAGCTGGGCT GTGTGCACGA ACCCCCCGTT CAGCCCGACC 7740  
 GCTGCGCCTT ATCCGTAAC TATCGTCTTG AGTCCAACCC GGTAAGACAC GACTTATCGC 7800  
 CACTGGCAGC AGCCACTGGT AACAGGATTA GCAGAGCGAG GTATGTAGGC GGTGCTACAG 7860  
 AGTTCTTGAA GTGGTGGCCT AACTACGGCT AACTAGAAG GACAGTATTT GGTATCTGCG 7920  
 CTCTGCTGAA GCCAGTTACC TTCGGAAAAA GAGTTGGTAG CTCTTGATCC GGCAAACAAA 7980  
 CCACCGCTGG TAGCGGTGGT TTTTTTGTTT GCAAGCAGCA GATTACGCGC AGAAAAAAG 8040  
 GATCTCAAGA AGATCCTTTG ATCTTTTCTA CGGGGTCTGA CGCTCAGTGG AACGAAAAC 8100  
 CACGTTAAGG GATTTTGGTC ATGAGATTAT CAAAAAGGAT CTTACCTAG ATCCTTTTAA 8160  
 ATAAAAATG AAGTTTTTAA TCAATCTAAA GTATATATGA GTAAACTTGG TCTGACAGTT STOP 8220  
BETA LACTAMASE  
 ACCAATGCTT AATCAGTGAG GCACCTATCT CAGCGATCTG TCTATTTCTG TCATCCATAG 8280  
 TTGCCTGACT CCCCCTCGTG TAGATAACTA CGATACGGGA GGGCTTACCA TCTGGCCCCA 8340  
 GTGCTGCAAT GATACCGCGA GACCCACGCT CACCGGCTCC AGATTTATCA GCAATAAACC 8400  
 BETA LACTAMASE=861bp=286 AMINO ACID & STOP CODON  
 AGCCAGCCGG AAGGGCCGAG CGCAGAAAGT GTCCTGCAAC TTTATCCGCC TCCATCCAGT 8460  
 CTATTAATTG TTGCCGGGAA GCTAGAGTAA GTAGTTCCGC AGTTAATAGT TTGCGCAACG 8520  
 TTGTTGCCAT TGCTACAGGC ATCGTGGTGT CACGCTCGTC GTTTGGTATG GCTTCATTCA 8580  
 GCTCCGGTTC CCAACGATCA AGGCGAGTTA CATGATCCCC CATGTTGTGC AAAAAAGCGG 8640  
 TTAGCTCCTT CGGTCCTCCG ATCGTTGTCA GAAGTAAGTT GGCCGCAAGT TTATCACTCA 8700  
 TGGTTATGGC AGCACTGCAT AATTCTCTTA CTGTCATGCC ATCCGTAAGA TGCTTTTCTG 8760  
 TGA CTGGTGA G TACTCAACC AAGTCATTCT GAGAATAGTG TATGCGGCGA CCGAGTTGCT 8820  
 CTTGCCCGGC GTCAATACGG GATAATACCG CGCCACATAG CAGAACTTTA AAAGTGCTCA 8880  
 TCATTGGAAA ACGTTCTTCG GGGCGAAAAC TCTCAAGGAT CTTACCGCTG TTGAGATCCA 8940  
 GGTCGATGTA ACCCACTCGT GCACCCAACT GATCTTCAGC ATCTTTTACT TTCACCAGCG 9000  
 TTTCTGGGTG AGCAAAAACA GGAAGGCAAA ATGCCGCAAA AAAGGGAATA AGGGCGACAC 9060  
 GGAAATGTTG AATACTCAT START BETA LACTAMASE CTCTTCCTTT TTCAATATTA TTGAAGCATT TATCAGGGTT 9120  
 ATTGTCTCAT GAGCGGATAC ATATTTGAAT GTATTTAGAA AAATAAACAA ATAGGGGTTC 9180  
 CGCGCACATT TCCCCGAAAA GTGCCACCT

FIG. 3F

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## LEADER

FRAME 1 Met Asp Phe Gln Val Gln Ile Ile Ser Phe Leu Leu Ile Ser Ala Ser Val  
 ATG GAT TTT CAG GTG CAG ATT ATC AGC TTC CTG CTA ATC AGT GCT TCA GTC  
 987 996 1005 1014 1023

-5 Met Ser Arg Gly Gln Ile Val Leu Ser Gln Ser Pro Ala Ile Leu Ser Ala Ser  
 ATA ATG TCC AGA GGA CAA ATT GTT CTC TCC CAG TCT CCA GCA ATC CTG TCT GCA TCT  
 1038 1047 1056 1065 1074 1083

Pro Gly Glu Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Val Ser Tyr Ile His  
 CCA GGG GAG AAG GTC ACA ATG ACT TGC AGG GCC AGC TCA AGT GTA AGT TAC ATC CAC  
 1095 1104 1113 1122 1131 1140

35 FR2 40 45 49 50 CDR2  
 Trp Phe Gln Gln Lys Pro Gly Ser Ser Pro Lys Pro Trp Ile Tyr Ala Thr Ser Asn  
 TGG TTC CAG CAG AAG CCA GGA TCC TCC CCC AAA CCC TGG ATT TAT GCC ACA TCC AAC  
 1152 1161 1170 1179 1188 1197

55 56 57 60 FR3 65 70  
 Leu Ala Ser Gly Val Pro Val Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser  
 CTG GCT TCT GGA GTC CCT GTT CGC TTC AGT GGC AGT GGG TCT GGG ACT TCT TAC TCT  
 1209 1218 1227 1235 1245 1254

75 80 85 88 89 90  
 Leu Thr Ile Ser Arg Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp  
 CTC ACC ATC AGC AGA GTG GAG GCT GAA GAT GCT GCC ACT TAT TAC TGC CAG CAG TGG  
 1266 1275 1284 1293 1302 1311

CDR3 95 97 98 100 FR4 105 107  
 Thr Ser Asn Pro Pro Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys  
 ACT AGT AAC CCA CCC ACG TTC GGA GGG GGG ACC AAG CTG GAA ATC AAA  
 1323 1332 1341 1350 1359

FIG. 4

LEADER

[illegible]

FIG. 5

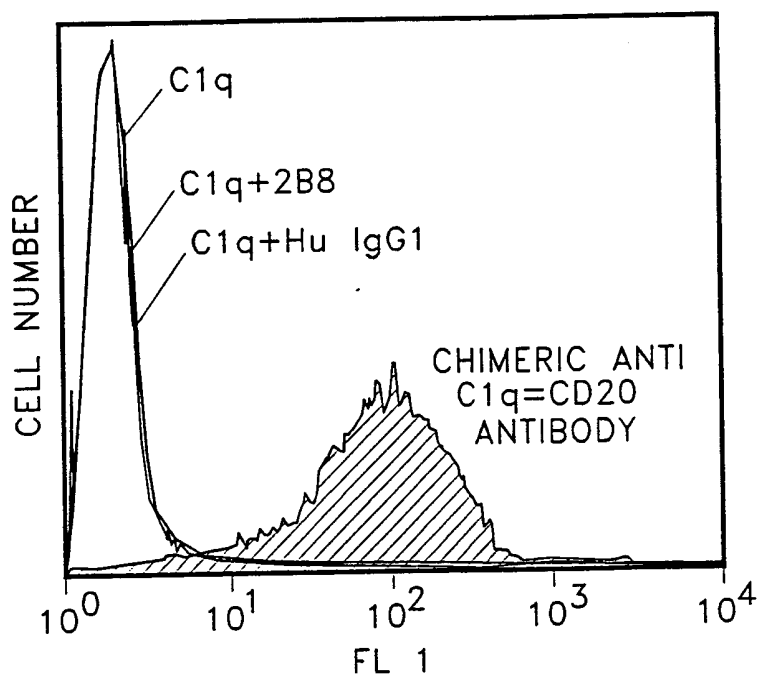


FIG. 6

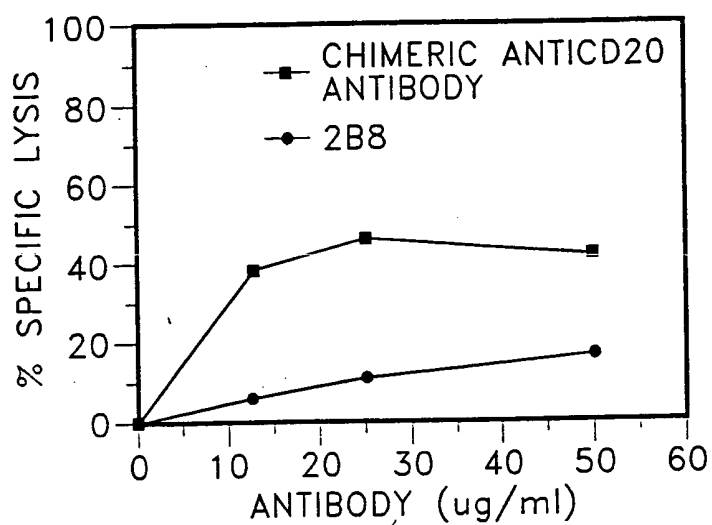
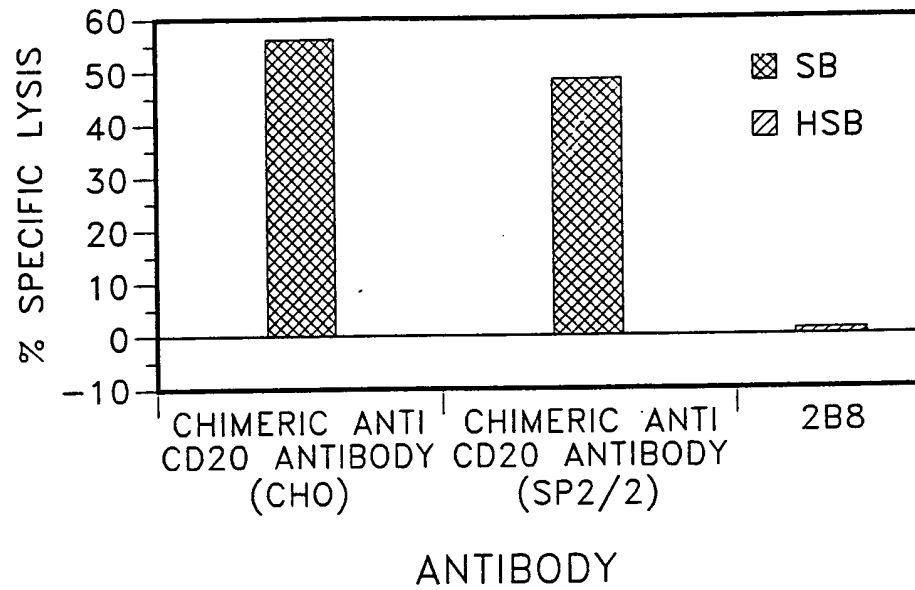
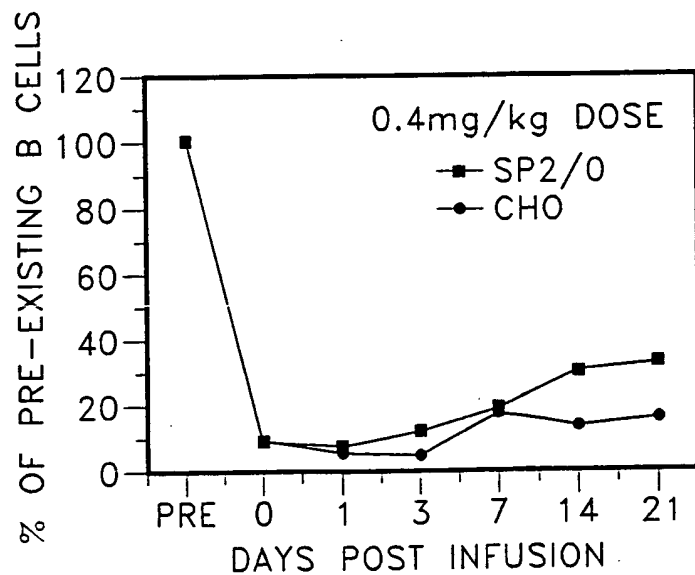
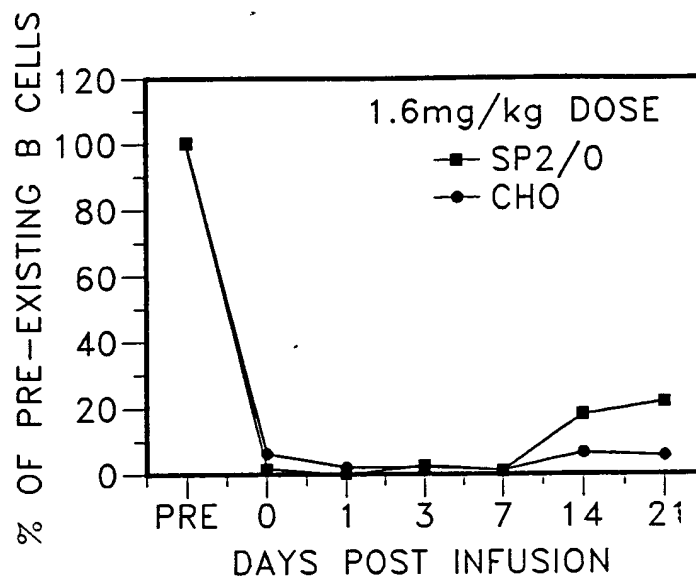
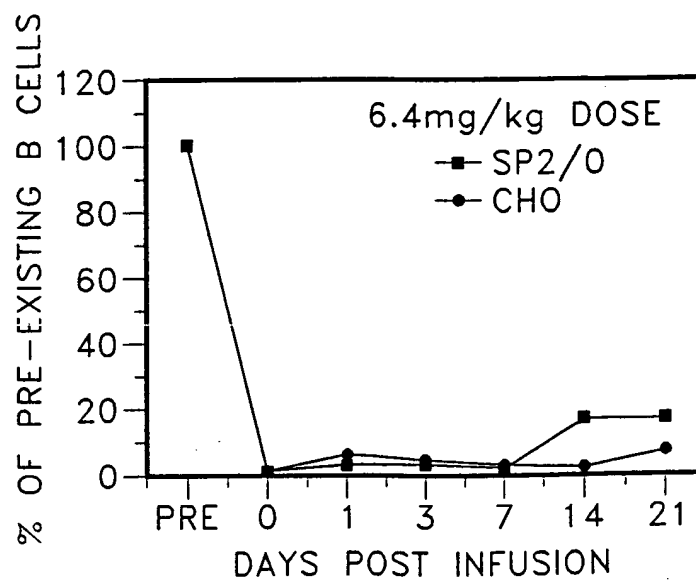
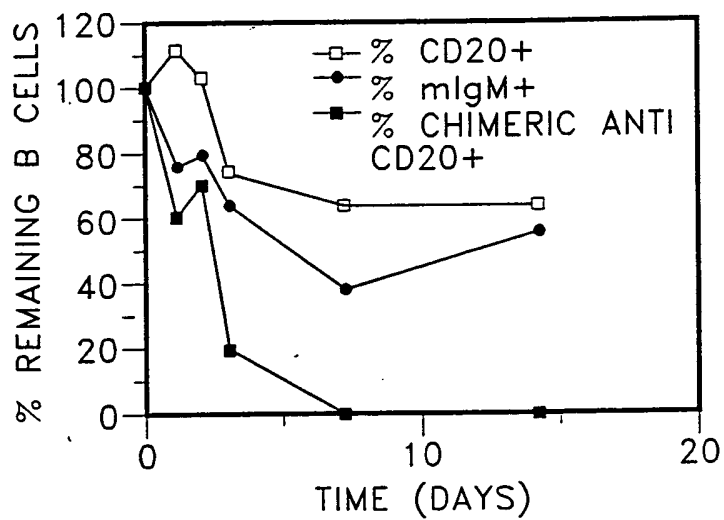
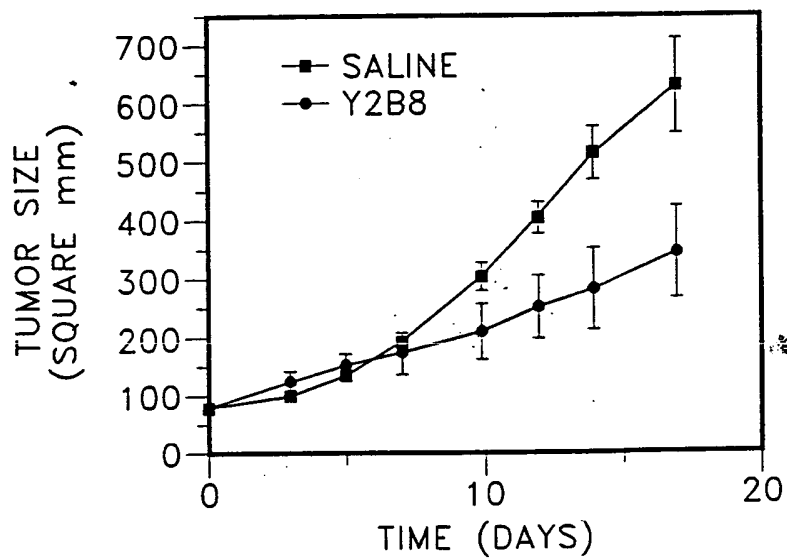


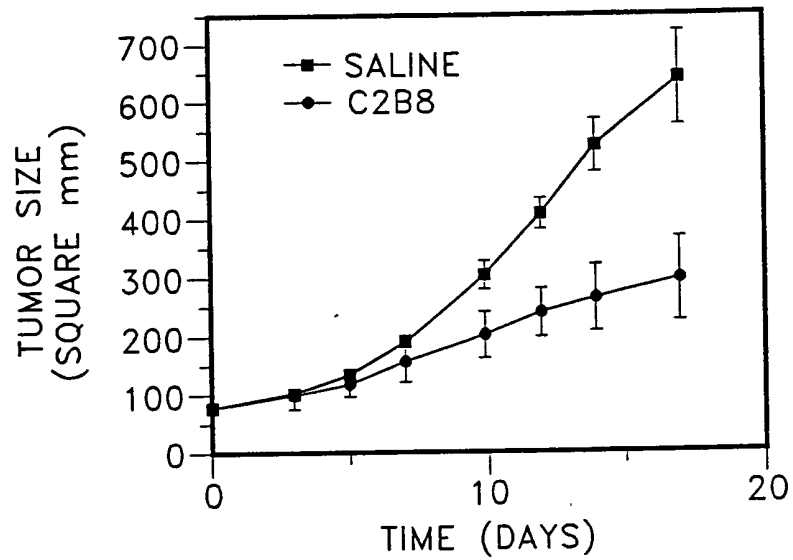
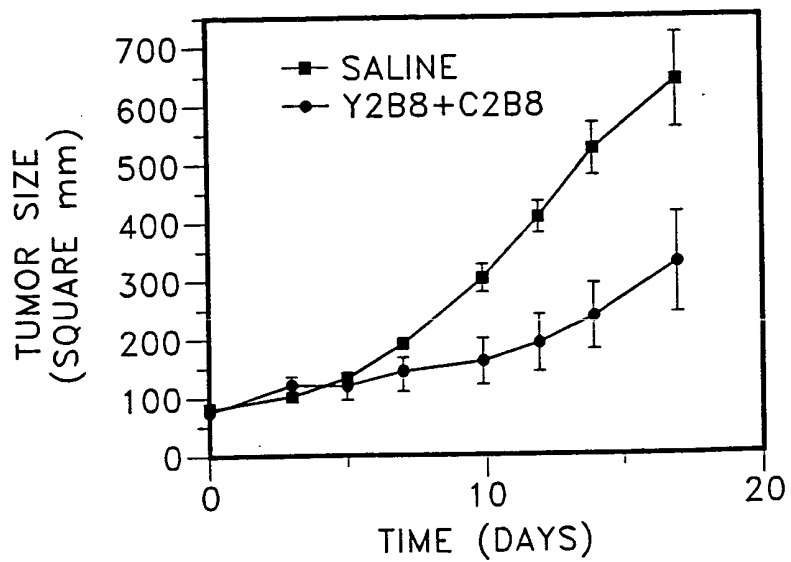
FIG. 7

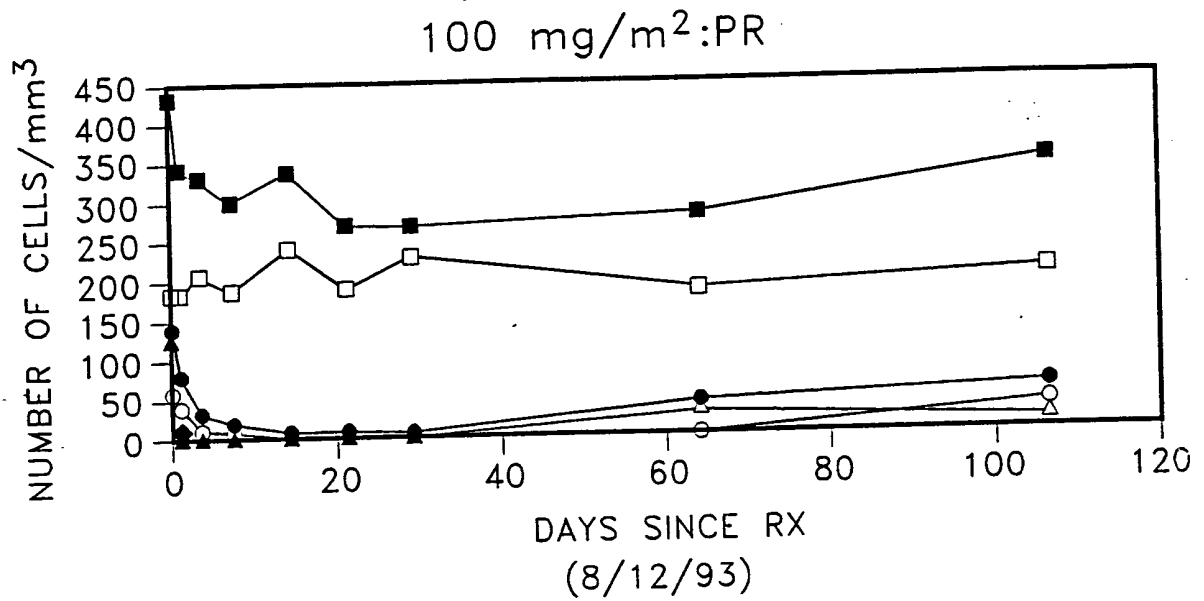
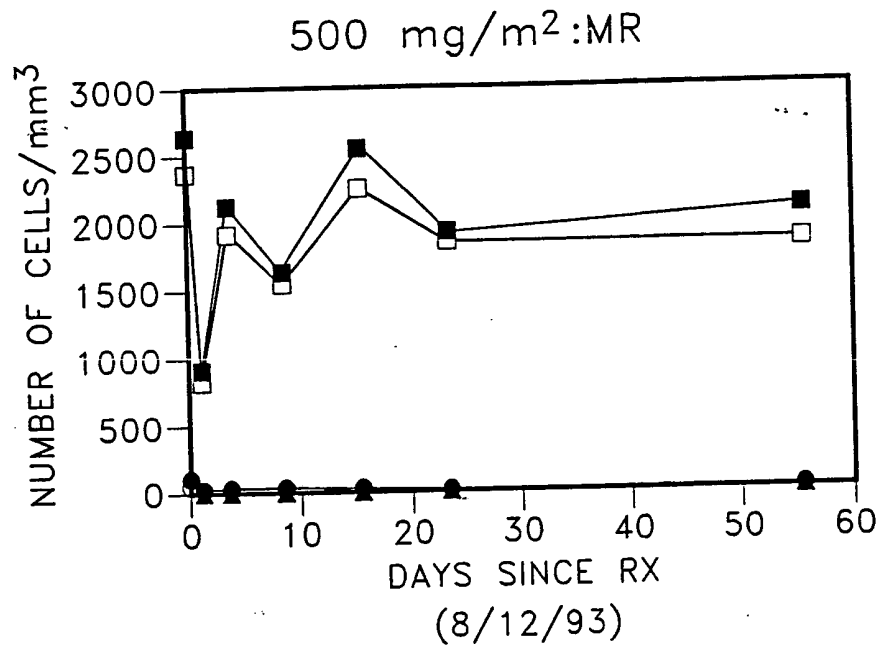


*FIG. 8**FIG. 9A*

*FIG. 9B**FIG. 9C*

*FIG. 10**FIG. 11*

*FIG. 12**FIG. 13*

*FIG. 14A**FIG. 14B*